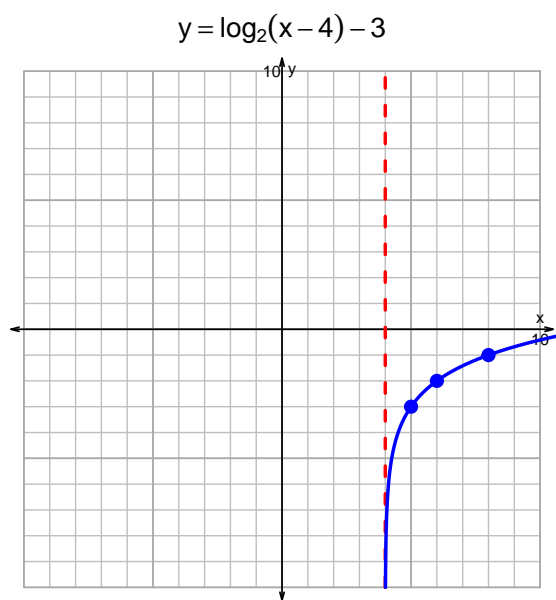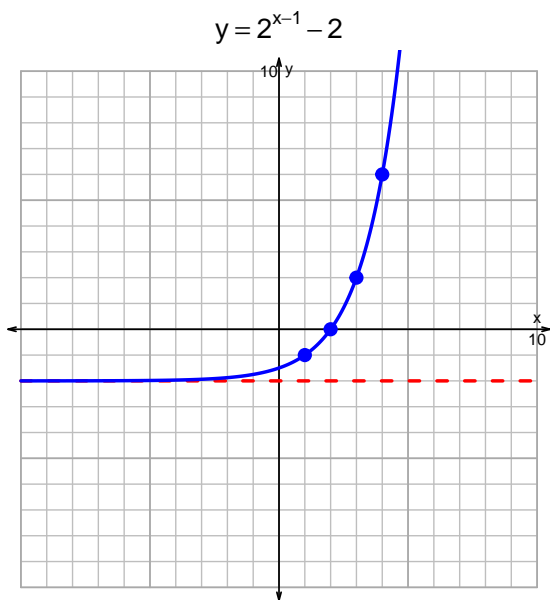## s18: EXP LOG (SLTN v350)

1. (10 pts) Graph $y = 2^{x-1} - 2$ and $y = \log_2(x - 4) - 3$ on the grids below. Also, draw any asymptotes with dashed lines.

$y = 2^{x-1} - 2$

$y = \log_2(x - 4) - 3$

Somewhat useful hint: $2^3 = 8$, and thus $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$29 = \left(\frac{5}{7}\right) \cdot 10^{3t/4}$$

Divide both sides by $\frac{5}{7}$.

$$\frac{29 \cdot 7}{5} = 10^{3t/4}$$

Take log, base 10, of both sides.

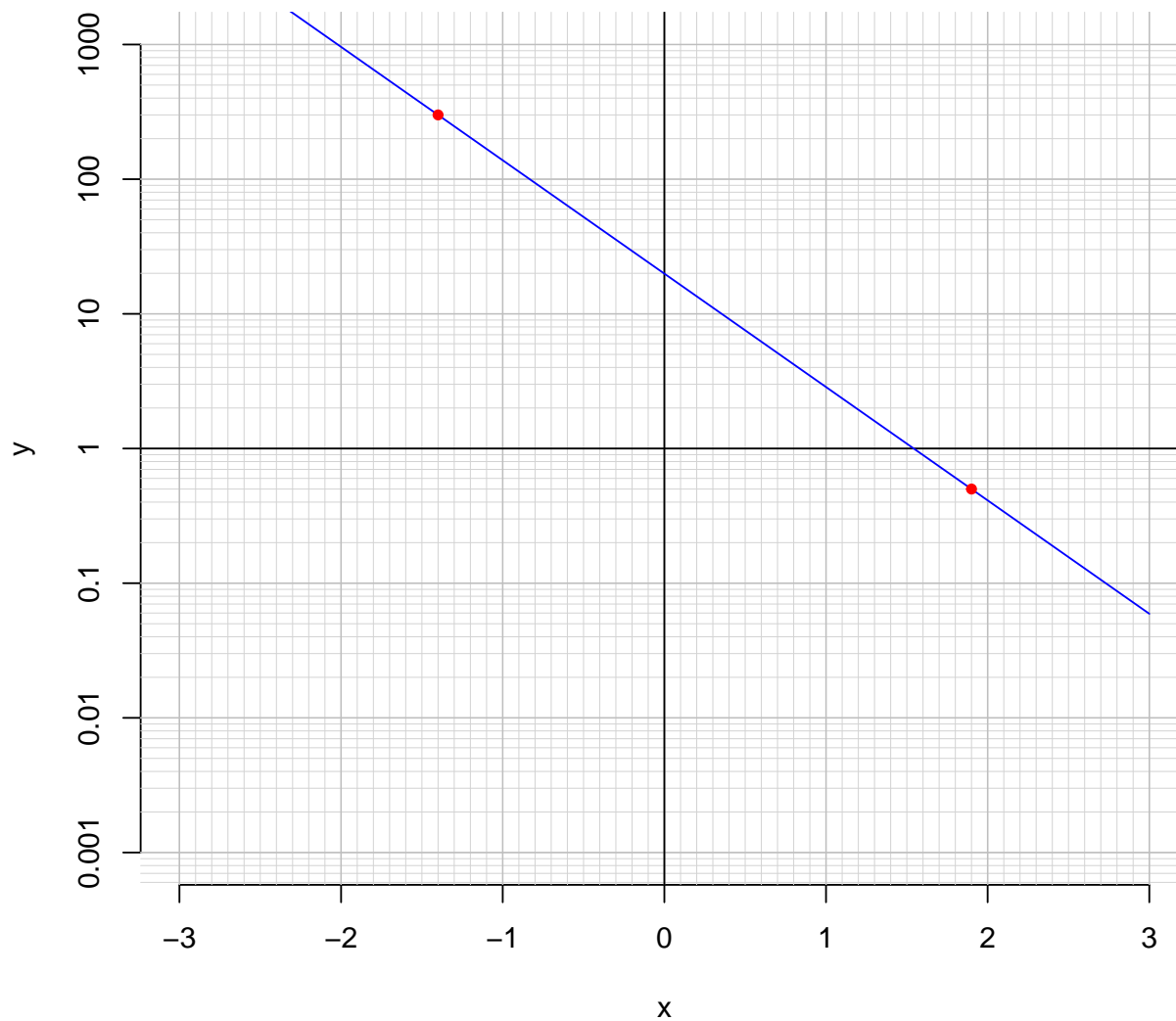$$\log_{10}\left(\frac{29 \cdot 7}{5}\right) = \frac{3t}{4}$$

Divide both sides by $\frac{3}{4}$.

$$\frac{4}{3} \cdot \log_{10}\left(\frac{29 \cdot 7}{5}\right) = t$$

Switch sides.

$$t = \frac{4}{3} \cdot \log_{10}\left(\frac{29 \cdot 7}{5}\right)$$

3. (10 pts) An exponential function $f(x) = 19.9 \cdot e^{-1.94x}$ is graphed below on a semi-log plot.

a. Using the plot above, evaluate $f(1.9)$.

$$f(1.9) = 0.5$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{-1}{1.94} \cdot \ln\left(\frac{x}{19.9}\right)$$

Using the plot above, evaluate $f^{-1}(300)$.

$$f^{-1}(300) = -1.4$$